

**MACHINE FOR PACKAGING A PLURALITY OF ARTICLES IN A CARTON, AND  
METHOD OF FORMING A CARTON**

- This invention relates to a packaging machine which is especially suitable for processing multiple package cartons from blank form to completed filled multiple unit cartons and to a method of forming such cartons. The machine can be readily adjusted to accommodate a wide range of carton sizes without undue time being taken to adapt the machine for running one size of carton to running a different size of carton.
- 10 The majority of known packaging machines are dedicated machines which construct only one size or one type of carton. Therefore, it is necessary to use a plurality of packaging machines to package different carton types, each machine taking up considerable floor space and being expensive to both purchase and operate.
- 15 In packaging machines which are required to construct cartons comprising internal compartments for holding a given number of articles, the construction of these cartons is usually complex and often dictates the speed of the machine. What is required is a packaging machine which can construct compartments within a carton with a minimum number of folding operations.
- 20 A further problem arises when loading the articles into the compartments and in particular where those compartments are in a spaced arrangement. It is known to provide article metering mechanisms which continuously load a group of articles into cartons, for example, wrap-around cartons used in beverage multiple packs. However,

where carton compartments are in a spaced relationship, it is necessary for some form of article grouping to be adapted.

It is an object of the present invention to provide a packaging machine which overcomes the technical and commercial disadvantages of known packaging machines.

In cartons where a display portion is provided, it is often desirable for display indicia to be shown through the display portion. The majority of known packaging machines are not able to orientate the display indicia on an article, for example, a label, so that it can be displayed. A limited number of packaging machines incorporate equipment to orientate the containers. However, this equipment is usually complex or extremely costly for example, use of survey motors or optic fibre and a printed colour spot on the label to identify (i) a suitable reference point and (ii) to align the reference point at the correct position.

Thus it is a further object of the present invention to provide a mechanism for incorporation into a packaging machine which is capable of orienting containers for example, batteries, using equipment which is relatively inexpensive and simple.

According to a first aspect of the invention there comprises a packaging machine for loading a plurality of articles into a carton which mechanism comprises carton erecting means for part erecting said carton to define a first article receiving cell, means for selecting a group of articles comprising at least two articles, means for separating said grouped articles from an adjacent like group of articles, means for loading said grouped articles into said first article receiving cell through an open end thereof in the packaged carton and a means for completing

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the construction of the carton characterised in that said carton erecting means comprises complementary die members, each said die member being mounted to a rotating wheel wherein each said complementary die member is adapted to inter engage when a carton blank is positioned between the two members, such that said die members cause the blank to be folded to define said article receiving cells. Preferably, the carton erecting means may comprise a device which effects a change in configuration of the carton from an inoperative configuration in which said first article receiving cell is formed to receive said grouped articles.

According to an optional feature of this aspect of the invention one of the complementary members may comprise a protruding portion extending from a working face of the complementing member and wherein the other said complementing member comprises a recessed portion adapted to receive said protruding portion and wherein the blank is placed on said receiving member and wherein the protruding portion forces part of the blank into said receiving portion.

According to another feature of this aspect of the invention the selecting means may comprise a plurality of channels mounted on an endless chain which channels are grouped to correspond to the number of articles to be placed into the first article receiving cell and wherein the channels are adapted to substantially align each article with the first article receiving cell.

According to another feature of this aspect of the invention, the carton may comprise a second article receiving cell formed by the carton erecting means in a spaced relationship to

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the first article receiving cell wherein the grouped channels comprise at least two channels in substantially parallel relationship to one another wherein at least two channels are adapted to diverge into a plurality of sub-groups wherein each sub-group is spaced to align an article held in each sub-group with one of the article receiving cells.

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Optionally, the packaging machine of this aspect of the invention may further comprise a conveyor including means to convey the articles and means to regulate the flow of articles to enable the articles to be aligned with each carton.

A second aspect of the invention provides a method of loading a plurality of articles into a carton whilst the articles and carton are moved in a synchronised manner and in a continuous forward direction comprising the following steps:

- i) transferring carton blank from a stowed position and erecting the blank to form the carton;
- ii) selecting a group of articles to be loaded into the carton
- iii) synchronously associating an article receiving cell formed from the blank with a given number of the grouped articles by sideways movement of the articles;
- iv) transferring the carton and loading the grouped articles into a carton through an open end thereof. The blank is erected by erecting means comprising complementary die members, each die member being mounted to a rotating wheel wherein each complementary die member is adapted to inter engage when a blank is positioned between the two members, such that the die members cause the blank to be folded to define the article receiving cells.

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A third aspect of the invention provides a mechanism for forming a carton including a pair of article receiving cells comprising complementary die members, each die member being mounted to a rotating wheel wherein each complementary die member is adapted to inter engage when a blank is positioned between the two members, such that the die members

5 cause the blank to be folded to define the article receiving cells.

According to an optional feature of the third aspect of the invention, one of the complementary members may comprise a protruding portion extending from a working face of the complementary member and wherein the other complementary member comprises a recessed portion adapted to receive the protruding portion and wherein the blank is placed on the receiving member and wherein the protruding portion forces part of the blank into the receiving portion.

A fourth aspect of the invention provides a mechanism for grouping a plurality of articles which mechanism comprising an endless series of channels along which articles may be transferred into a plurality of article receiving cells of a carton wherein the channels are organised into groupings whereby each grouping corresponds to a given number of articles to be loaded in the carton.

20 According to an optional feature of the fourth aspect of the invention the channels may be adapted to be substantially parallel to one another and then diverge into sub-groupings wherein each sub-group is spaced to align an article held in each sub-group with one of the article receiving cells corresponding to each one of the cells of each carton and wherein the

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sub-groupings are each substantially parallel to one to provide in line parallel access to the cells.

A fifth aspect of the invention provides a mechanism for causing a label affixed to an article  
5 to be oriented to a predetermined display position wherein the article includes a portion protruding outwardly of the article in a fixed position relative the label, wherein the mechanism comprises support means adapted to support an article, orientation means adapted to cause the article to rotate in the support means until the protruding position is restrained by abutment means formed in the support means. Preferably, one edge of the label affixed to the article overlays an opposed edge of the label to define the protruding portion.

According to an optional feature of the fifth aspect of the invention, the support means may comprise a channel including a support surface to retain part of the article within the channel. Preferably, the support surface may substantially correspond to the exterior surface of the  
15 retained part of the article.

According to another optional feature of the fifth aspect of the invention the orientation means may comprise an elongate member connected to resilient means, wherein the elongate member is adapted to abut a portion of the article as the support means is moved in a  
20 substantially parallel plane to the elongate member such that a tangential force is applied to the abutting portion of the article to cause the article to rotate. Optionally, the resilient means may be adapted to reduce the tangential force when the protruding portion is restrained by the abutment means.

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According to a further optional feature of the fifth aspect of this invention, the abutment means may be formed from an upper edge of the channel.

A sixth aspect of this invention provides a method of orienting to a predetermined display position wherein the article includes an outwardly protruding portion in a fixed position relative to the label a label affixed to an article which method comprising the steps of supporting the article in support means during forward movement, rotating the article within the support means until the protruding portion abuts a portion of the support means and retaining the article in its desired orientation for loading into a carton.

Embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings in which:

FIGURE 1 is a perspective view of a selection of "blister pack" type cartons packaged by a machine according to one or more aspects of the invention;

FIGURE 2 is a plan view of a unitary blank used to construct one type of carton capable of being used with a machine according to the invention.

FIGURE 3 is a perspective view of the carton formed from the blank shown in Figure 2.

FIGURE 4 is a perspective view of a machine according to one or more aspects of the invention;

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FIGURES 5a and 5b are perspective views of the carton supply in-feed and set-up stations of the machine shown in Figure 4;

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